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ABSTRACT

This selective review covers user studies done from the standpoints of both the library and the user. Use of catalogs, reference services, circulation, browsing and library facilities are included as are information-gathering habits of scientists and the general public. Studies of whole information systems and the methodology and philosophy of user studies are discussed. The coverage of 181 listed papers is restricted to those in the English language through 1968, with a number of 1969 papers included. (AB)

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USER STUDIES: A REVIEW FOR LIBRARIANS AND INFORMATION SCIENTISTS

by

Marcia J. Bates

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USER STUDIES: A REVIEW FOR LIBRARIANS AND INFORMATION SCIENTISTS

I. SELECTION CRITERIA

This is a selective review of the field of user studies within library and information science. The intent of the selection was to find a set of readings such that any person familiar with all of them would have a thorough, balanced grasp of the field of user studies--after having read far fewer than the total number of papers available in the field.

The review covers studies done both from the standpoint of the library and from the standpoint of the user. The former sort of study is usually done by librarians and is concerned primarily with the library--who uses it, for what purposes, etc. The latter sort of study is generally done by psychologists and other social scientists and looks at users' information-gathering habits as a whole, following the search wherever it may lead, whether to libraries or other sources.

Use of catalogs, reference services, circulation, browsing, as well as the library facilities in general are included, as are all sorts of information-gathering habits, relating both to formal and informal sources, of scientists and other experts. Information-gathering habits of the general public are covered as well, including their knowledge of the library, its accessibility

(NB: There are no sections II-IV or pages 2-21.)

to them, librarian attitudes toward them, and the differences between users and non-users of libraries. Finally, studies of whole information systems, and the methodology and philosophy of user studies are discussed.

The focus is on empirical studies rather than on papers based on speculative or intuitive judgments. General library system analyses are excluded, but occasional direct studies of users which happen to be a part of such analyses are included. The research sub-areas of indexer consistency, relevance judgment, selective dissemination of information, citation counting, school library use, and reading interests, are excluded. The coverage is restricted to English-language papers; there is thorough coverage through 1968, with a number of 1969 papers included as well. Emphasis is on recent work. All papers described herein were personally examined by the reviewer, with one exception, which is noted in the text.

V. CATALOG USE

As the chief means of access to a library's collection (in most libraries), the catalog is a very important part of the institution. Its use can be, and frequently has been, separated from use of the library as a whole. Such studies will be considered here.

Frarey (63) reviewed what he felt were all the papers of any importance on subject catalog use up through 1953. Because of the nature of the studies reviewed, however, information on use of author-title material is also often included. He gives a nice summary of what the studies had uncovered to that date. A paper by William Randall (150), published in 1930, suggesting that the use of catalogs should be studied scientifically, was taken by Frarey to mark the beginning of objective research on catalog use.

Merritt (118), with the help of special charge-cards, determined the number of items charged out whose source was the subject catalog or the

author-title catalog in a university library, as well as other information of interest on the subject catalog. Knapp (92, 93) focused on difficulties with subject headings. She provides an interesting and valuable breakdown of the various sorts of errors made by users of the subject catalog. This description of errors is derived from a comparison of the headings actually searched under by library patrons with the headings adjudged correct for that need by the researcher.

Penalosa's Master's thesis (139) was concerned with catalog use in general, not just use of subject material. People were interviewed at the catalog, asked what they were looking up under, the kinds of information they wanted, etc. A great many Master's theses have been done in this general area.

Brett (42) claims, on the basis of his studies, that catalogs are almost unnecessary for reference librarians, that they can do almost as well without them. Fern (61), however, emphasizes the situations in which the card catalog is the best or easiest-to-use source for reference librarians.

Perrine (142) analyzed not all difficulties in using the catalog, but rather those which were of enough concern to the user that he questioned the reference librarian about them. Some twenty-three university and public libraries participated.. Unfortunately, the breakdowns of problem types are not very revealing.

Possibly the largest study of catalog use ever done was that by the American Library Association in 1958 (7). The study reports the results of over 5,000 interviews regarding both subject and author-title use in 39 libraries, including academic, public, special, and high school libraries.

Several studies have been concerned with fundamental practices in cataloging. Krikelas (94), using undergraduate students, compared the effectiveness of divided and dictionary catalogs in large university libraries and concluded that neither could be shown to be superior.

The discovery of the University of Chicago Requirements Study for Future Catalogs (173) was a pleasant surprise. This research is even more fudnamental; it is of a sort that should have begun years ago. Instead of studying use of the catalog as presently constituted, the authors tried to determine what sorts of access points a catalog should have in the first place. They did this by studying the sorts of things people are likely to remember about books when they want to look at one again. (This research is directly applicable only in those instances where people have seen a book before and now try to find it again in the catalog. This is an estimated 15-20% of all catalog uses--reviewer's calculation, based on data on pp. 85-86.) Work along a similar line has been done by Ayres, et al. (32). In finding that the title information the user brings to the catalog is correct more often than the author information, they question the long-standing centrality of author in cataloging tradition. If users frequently remember titles better, then maybe titles, not authors, should be emphasized in cataloging. It should be noted that with the flexibility newly made possible through computers, consideration of radical changes in cataloging practices is not unrealistic.

Hoage (79) describes a study of use of the Library of Congress classification. Her description of the study is tantalizingly brief. Two questions which seem to be asking the same thing--both testing whether the respondent is searching in the stacks for a specific book known beforehand or just browsing through a subject area--get quite different results. This unexplained difference is of interest because there are some signs in other research that the actual functions of subject cataloging and classification are different from what we might expect (see Frarey, 63, p. 157).

Bundy (43) and Berelson (35) provide information on the use of the catalog in the context of library use as a whole. The Berelson book is an

excellent summary of quite a number of studies on public libraries which had been made up until that time (1949); Bundy's is one of the few extensive studies on public library use done since then. Examples of the kind of information provided: Bundy gives the percent of total library users who used the catalog (19%); Berelson gives the proportion of library users with varying degrees of familiarity with the card catalog (a whopping 29% do not even know what the catalog is.)

VI. REFERENCE USE

This topic covers the use of reference services in libraries, primarily those associated with the use of the reference desk.

If studying catalog use is difficult--interviewers following users around distorting results, etc.--studying reference use is even more difficult. It is relatively easy to define catalog use, but that essential first step in studying reference, simply defining it, has been a critical problem in this area. Asking questions of a librarian at a reference desk is obviously reference work, but is bibliography-making and translating also? And when we study those reference questions, how do we break them down, classify them? Merely counting questions is not enough--an analysis which lumped hour-long searches in with directions to the restrooms would be meaningless.

The place to start in this area is a 1964 review by Samuel Rothstein (156), in which many of the findings to that date are summarized. The definitional problem is discussed in detail in Shores (161) and Hieber (78). The first paper describes ALA efforts at formal definition of reference work; the second gives an excellent review of the various ways reference questions and answers have been analyzed. With such a breakdown available one might at last attempt to analyze the nature of reference questions in a systematic way, including a determination of which sort of breakdown would be most useful for what purposes.

Taylor (171) describes two studies in which he 1) isolates five stages in question-negotiation between patrons and librarians, and 2) presents the results of a preliminary study of the actual search strategy of a group of undergraduates. This area of student search strategy is of obvious great value in understanding library use--yet it seems virtually untouched.

As examples of the sort of analysis of reference questions which goes on, two good papers are Herner and Herner (73) and Los Angeles (100). The first analyzed scientific library requests by type of information wanted (e.g., description of process, description of equipment). The Los Angeles study analyzed reference questions by a sort of form--directional questions, factual questions, reader advice, etc.

One quite intriguing approach was taken by Mote (122). He divided scientists at a research center into three graded groups according as their subject area was well organized and well-defined, or chaotic and ill-defined. He then searched the library inquiry records to see how many requests had been made by each scientist. The results were striking--scientists in less organized fields made far more. This is a topic that should be followed up.

The Bundy study (44) surveyed the actual reference services provided in American libraries. The results are sometimes not maximally useful in the way they are broken down. For example, statistics such as the following are given: 95% of the libraries served high school students, 94% servied teachers, etc. As most of the patron types were served in high percentages of the libraries, such yes-or-no statistics are not very revealing. And even if there were more variation in these statistics, we could get more out of a distribution of patron types for each library or group of libraries. Nonetheless, some basic statistics of interest were revealed by the survey.

Two studies put reference service use in a broader context. Berelson (35), in summarizing many studies on all aspects of library use, gives the

characteristics which distinguish reference service users from other patrons of libraries. Hernor (72) describes all the major information-gathering methods used by scientists, including the relative amount of use of various reference services, such as preparation of bibliographies, translations, etc.

VII. LIBRARY CIRCULATION (MATERIALS USE)

Studies reviewed in this section are overwhelmingly based on library circulation data. That is, they are concerned only with the use of library materials. Studies of library use in general (Section IX) are generally based on questionnaire data and are asked of people using the library facilities in any way. There is a large body of material in both of these categories; hence it seemed wise to distinguish them.

Two good reviews are available for material in this section; the first is part of Jain's thesis (86). The thesis itself is a systems analysis study concerned with predicting patterns of use of library materials and so does not concern us, but the review is very helpful. Jain covers quite a number of studies. He makes little criticism of the papers and does not compare or draw together the results of the various studies, but with his careful laying out of results, this is not hard to do. While Jain touches on more papers and covers a broader subject area (including some general library use as well), Woods (181) reviews twenty-five studies specifically on student materials use in some detail and pulls the results together in a summary.

There is a certain group of basic variables on which data have been gathered in these studies. Comparability problems are less severe here than in other areas, but one must still be careful in comparing results. On most variables the studies seem to converge fairly well; on a few, wildly different results have been gotten. For example, there is a high agreement that frequency of use goes down exponentially with age of book, but total disagreement

on which undergraduate school years are the peak years in use of library books.

Very many of the studies seem to have been done on book circulation in college libraries. Examples are Jain (87), Lane (95), Barkey (34), and McDiarmid (102). Jain used a more sophisticated method than is usual; he included in-library use. Lane's study was longitudinal--he followed certain undergraduates through two years and analyzed their book use. McDiarmid's study was done on seven college libraries and thereby point up a weakness which is general in this field; he found that institutional differences accounted for more variation than any other variable--yet most studies are of one institution only and therfore do not test this important factor. This probably accounts for much of the variation mentioned above that can be found on certain variables. One would hope that the field would benefit by such findings and more studies would be done taking institutional differences into account. Unfortunately, McDiarmid's study was published in 1935 and for the most part this institutional factor remains untouched.

Two other studies of college libraries should be noted. El-Sheniti (55) analyzed faculty use of books (emphasis in the studies mentioned above was overwhelmingly or entirely on students). Humanities, as well as science faculty were included. Fussler and Simon (64) used data from a related but different source from that generally used: They analyzed the charge-out records for books (e.g., the stamped sheet in the back of the book). Thus, their unit of analysis was the book rather than single charge-outs. Their focus was on the life histories of books (over a limited, but fairly long, period of time) rather than on the distribution of books or users in all of the charge-outs of a library at one point in time. The Jain thesis (86) has a good discussion of the relative merits of these two approaches.

Mueller (123) and Berelson (35) represent studies concerning public libraries; the Gordon Randall study (149) was done in a special library. Mueller

found that variation in circulation of new titles from one public library to another was affected much less by the usual sociological and demographic variables than by simple visibility--whether or not new books were put on a "new arrivals" shelf or not, etc.

Urquhart's (176) and Strain's (168) papers are examples of studies of periodical circulation. The former studied periodicals circulated from the Science Museum Library in London, the latter, an IBM library. They get the usual exponential age/use curve. Fussler and Simon (64) also discuss periodical aging. Many of these periodical studies are of no interest to the user study field because they are done only to discover the most popular journals in a field so that other libraries may be guided in selection. Raisig (148) presents a blistering critique of the methodology generally used in periodical circulation studies and proposes improvements.

VIII. BROWSING AND IN-LIBRARY USE

In-library use refers to the use of books in the library without charging them out. The definition of browsing runs somewhat crosswise to this. Browsing refers to using books for which one did not have specific identifying information beforehand, such as author or call number. Browsing use is one sort of in-library use but it can also lead to charging out of books--which we have defined out of in-library use. On the other hand, in-library use can result either from browsing or from prior knowledge about the material.

To demonstrate why these processes have been distinguished in this particular manner, here are some of the uses of data on them: In-library use is studied in order to make decisions about whether to have open or closed stacks, or a distant storage facility, and to demonstrate to library trustrees that the <u>total</u> use of books is much greater than circulation figures would indicate. The importance of browsing came home when Menzel (114) demonstrated

the value of serendipitous, unplanned, discoveries of information in scientific research. Some of these came through personal contact, others through browsing. But books used through prior knowledge of them are by definition not discoveries--hence the distinction made. We are not interested in system-analytic decision functions here but we do want to know about both these kinds of use as use.

This is a difficult area to research and studies are relatively few. Fussler and Simon (64) give an excellent discussion of various methodologies which have been used and might be tried to measure in-library use. They also did a study of their own in which they found that non-recorded use of books (in-library use) was roughly proportional to recorded use (circulated items). Bovey and Mullick (40) got contrary results; they found a very low correlation between recorded and non-recorded use in most instances. They also report for the study they did the percent of charge-outs which resulted from browsing. Jain (87) reports comparable figures for his study. Both Gaskill et al. (65) and Fussler and Simon (64) report figures for ratio of in-library use to charge-outs for college libraries. The Los Angeles study (100, vol. III) reports figures for its public libraries. The ratios given in these studies vary between negative ones of higher circulation than in-library use, to high positive ones, the highest being twelve to one. Counting methods and other extenuating circumstances can be brought in so that these figures do not appear nearly so discrepant. The true range is probably somewhere between six and ten to one (assuming the proportion is reasonably constant at all). The most interesting aspect of the Los Angeles study is not the ratio but rather the variations of the ratio among subjects. It is hard to tell what purely local influences might be involved, however.

Bundy (43) mentions the percent of library users who browse through the stacks in public libraries. Dubester (54) reports a study in the Library of

Congress and gives purposes for using the stacks and state of knowledge about desired materials at the time of entering the stacks. Unfortunately, most of the fairly small sample of interviewees were Library employees.

Bowen's Master's thesis (41) was intended to augment Fussler and Simon's study. She considers a number of aspects of browsing, for example, shelf-level effects, and the proportion of browsed books rarely circulated (important in deciding whether to rely on circulation figures as a basis for determining which books should go to a storage library).

IX. USE OF THE LIBRARY AS A WHOLE

Studies falling under this topic are concerned with use of the library as a whole, rather than concentrating on any particular component of it, and, as mentioned in an earlier section, frequently get their data from a source which suits this aim: Questionnaires given to all persons entering the library. Breakdown of activities performed in the library, amount of success in achieving goals, and attitudes toward the library are all included in this topic. Whereas this section is concerned only with library users, the next section will discuss studies which enable comparison of users with non-users.

The Jain thesis (86) provides many references in this area. Studies in college libraries generally focus on a fairly small set of variables. They are almost universally based on questionnaires or, occasionally, interviews with library users. Some examples follow:

Bovey and Mullick (40) carefully studied users of Johns Hopkins University libraries. They give results on the distribution of activites performed in the libraries, success in use, and causes of failure in getting books. The Gaskill et al. study (65) was done much earlier (1934) but appears to be well done. It covers much the same material as the Bovey and Mullick study. Nicholson and Bartlett (125) also considered purposes for being in the library.

Jain (87) studied the same variables, as well as attitudes toward the library (why people preferred to work at the library or at home). Williams (179), studying the John Crerar research library, determined the distribution of bibliographic sources for requested items (how many requests originated with the catalog, periodical indexes, etc.) and also related user characteristics to their searching habits, among other things.

The University of Michigan study (175) surveyed the Michigan faculty on their attitudes toward and use of the university library. Distinctions were made between subject fields on the amount of use of the library. One result was amusing: faculty disliked the dispersion of materials around campus in departmental libraries, but they would not want their <u>own</u> department's library merged with the main library.

A particular sub-problem in library use is use of public libraries by students for class work. The Schick et al. article (157) gives a general picture of this problem--which puts severe pressure on public libraries--as well as some nationwide statistics. Haas (68) did quite a large and thorough survey of college student use of metropolitan New York's libraries. Along a slightly different tack, Line and Tidmarsh (97) surveyed student attitudes toward their own college library several years, and many innovations to help students in using the library, after an earlier survey on the same thing. Results were not encouraging; however, the innovations were generally minor, e.g., a one-hour lecture on how to use the library.

In general public library use the classic work is Berelson (35). He synthesized the results of many studies on all phases of library use (including, as one of the more important studies, Campbell and Metzner [46]). This masterful summary apparently had such a once-and-for-all quality about it that, as far as can be determined, few studies of public library use have been made since then (1949). Bundy (43) confirms this in her article. Factors

considered by Berelson were catalog use, reference use, characteristics of circulated materials, characteristics of library users, frequency and timing of library use, effect of distance from libraries, and much more!

The Bundy (43), Monat (120), and Monat et al. (121) papers describe two of the few post-Berelson studies (the latter two references are the shorter and longer versions of the same study). Both studies appear to be well-done. Bundy's study of the metropolitan Baltimore-Washington area was impressively large-scale; the results are based on 21,000 returns (79% return rate). The survey covered many aspects of library use. Results of this as well as of the Monat study are similar to Berelson's. Monat studied library service in five medium-sized Pennsylvania cities.

The best first place to look in the recent literature of public use of libraries, however, is the Mendelsohn and Wingerd study (110), because it is of national scope. Over 1500 adults were interviewed, who had been selected in such a way as to be representative of the adult population as a whole. Figures on library use are given, and results are included from questions on attitudes toward libraries. Libraries have a generally positive image, but only 6% called them "fun." An excellent review of major recent use studies is included as well.

In the special library and information center area, three articles were noted. Feinler et al. (59) give data on the familiarity with and use of existing specialized information centers by physicists (very little), and also include comments by these scientists on needed improvements in the information system. They also asked the physicists' opinions on the establishment of a national information center in the their sub-specialty. As this had to do with proposed establishment, and many had not had any experience with such information centers before, they were not really in a position to make reliable judgments

about the proposal. The Minder et al. paper (119) represents a polling of users of present federal information centers, e.g., Defense Documentation Center, on their level of satisfaction with these services. The poll was restricted to librarians, who are an important portion of these users. The poll was fairly small, and had a low return rate (42%). The Meister and Sullivan paper (108) is the first or one of the first of a new sort of library use study: It concerns user reactions to a prototype on-line retrieval system.

X. CHARACTERISTICS OF LIBRARY USERS VS. NON-USERS

The coverage of this topic is self-explanatory. Several public library studies considered this along with other aspects of library use: Berelson (35), Bundy (43), Monat (120), and Mendelsohn and Wingerd (110). They are all in considerable agreement on the characteristics of library users, generally young, above average education, professional and managerial occupations over-represented, etc. Clayton (47), observing that library use varies considerably from one student to another, decided to investigate students' social and economic background to see if such characteristics could be correlated with library use. All in all, he found little evidence that his particular set of characteristics were good predictors of library use. Mote's study (122) contrasted technical library heavy and light users in an unusual way (see also Section VI).

Parker and Paisley (136) examined this at the community instead of individual level. They looked for those characteristics of communities which were associated with a high or low library circulation. Where the community and individual levels were comparable, they found results similar to Berelson's.

Another small sub-area which fits in this category concerns the percentage of a population which uses libraries. Berelson (35) reports on this

for library use by the general public and Mendelsohn and Wingerd (110) update it to recent times. Bundy (43) gives figures which can be used to calculate the percent of the population using public libraries on a given day.

These data also often crop up in studies of college library use, where it is of particular interest since it is felt that all students should be using the library. Figures are generally given as percent of students using the library in a month, or semester. Whatever the particular scale used, the results are usually low. Barkey (34) and Lane (95) each found the percent of students withdrawing books; Lane again, and Gaskill et al. (65) determined the percent of students using the library in general (not just withdrawing books). Barkey discusses his low figures somewhat more than the others do. Haas (68) gives figures on the percent of college students using public libraries.

XI. USER KNOWLEDGE OF LIBRARY AND LITERATURE

The relevance of this section to user studies seems obvious--we want to know how much users know about the library in order to determine how successful they can be expected to be in using it. But there are a couple of considerations which should be kept in mind in evaluating the results of tests of user knowledge.

First, because a user does poorly on a library knowledge test does not mean he will do poorly in using the library. There are degrees of knowledge and degrees of need to know, and it may be that the first is equal to the latter, i.e., the user knows all he <u>needs</u> to know, even if it is far from being all there <u>is</u> to know. So then it might seem that user knowledge tests should be graded in relation to how much a user needs to know, the high school student little, the college student more, the scholar still more.... But it can also be argued that if the user knew more about what was available in a library, more needs would occur to him, and this would be good, because then he would

learn more and libraries would be utilized more--so even the high school student should know a great deal. But this in turn implies that there should be some ideal standard of "total library knowledge" against which existing knowledge should be tested. How on earth do we determine such a standard? Obviously, we can go round and round indefinitely on such issues. But one point should be clear: It is not at all self-evident what it is that tests of library knowledge tell us about the potential success of library users.

A second point concerns the sort of questions asked on these tests. Hurt (83), for example, asks the students to name other periodical indexes besides Reader's Guide. A student's failure to answer this question does not mean that he does not know of other guides or is incapable of using them. He may have noticed at one time that there are a lot of indexes on different subjects in one section of the reference room of his library, and whenever he delves into a new subject he checks to see if there is an index on it. Is this not all he reasonably needs to know about the existence of periodical indexes? Yet he may never have picked up the names of any of them. Thus, what at first appears to be a dreadful ignorance of libraries, failure to name even one other periodical index besides Reader's Guide, may not be bad at all. The point of all this is that one should be very careful in interpreting the results of these tests--and researchers should be careful in designing them! They should be designed to test working knowledge, not knowledge based on memorization.

Problems such as the above appear to have been little considered in the studies on user knowledge; in fact, user knowledge itself is a very sparse field of research. Few reviews or studies were discovered.

Bonn's (39) extensive review (several hundred items) on training laymen in the use of the library is just that; it is concerned with articles on training laymen, not on laymen's knowledge of the library. Smith's (165) very

brief (two pages) discussion of the matter is of little help.

As for studies on user knowledge, Hurt (82, and the longer version, 83) made quite an extensive study (350 students) of University of California at Berkeley and Stanford University graduate students. The test he gave them was difficult and he found their knowledge low (but remember the cautions on this). Loutitt and Patrick (101) published a study in the Journal of Applied Psychology and, presumably, were not librarians. They also tested a large number of students, undergraduates this time, and gave them a somewhat easier exam than Hurt did. This study is quite old (1932), and used either unusual or else now-superseded statistical analysis procedures; it did not use the techniques usually employed for the relatively simple needs of this case. Malcolm's Master's work (104) also involved quizzing students on their knowledge of the elements of the catalog card. It is a more modest study than the previous two. All in all, the work in this area is disappointing.

William's paper (179), not primarily intended as a study of user knowledge, is probably the most useful of any mentioned. He correlated education in the use of libraries with searching habits. He found that people who had had education in library use used periodical indexes and abstracts significantly more than those who had not had such training.

XII. ATTITUDES TOWARD USERS HELD BY LIBRARIANS

This topic was included here because it was felt that attitudes of librarians toward their own service and toward the public should have a strong effect on library use and attitudes of users. Librarians will have this effect not only in their direct relations with the public but also in the atmosphere and arrangements they create in the library.

The field, it appears, is for all intents and purposes unresearched.

Only two doctoral theses were found relating to it. Penland's thesis (140) is presented in much shortened form in a journal article (141). The article is a bit too brief in some respects and here the thesis is helpful. He used sophisticated psychological testing methods to discover librarians' real attitudes on their role as educators of adults. He found the correlation very low between consciously expressed attitudes on this function--that librarians should function in this way is a strongly held philosophical tenet in the field--and their real attitudes.

Douglass' thesis (53) is technically somewhat peripheral--he wrote on the personality of the librarian--but we can consider his results in relation to their likely effect on the nature of libraries. In an extensive and carefully done study, using recognized standard psychological tests, he found that library school students all too well confirm the common stereotype of librarians; they are orderly, perfectionist, passive, lacking in decisiveness and imagination; the interests of male librarians are somewhat feminine, and so on. These are of course only tendencies, not black and white absolutes, and there will be great individual variation on these qualities, but on the average librarians will reflect them to some degree and so will the institutions they create.

More work of the above sort is needed. Another potentially useful tack--which appears not to have been taken--is the following: Studies of a pure opinion-polling nature have obvious limitations, because of the human desire for approval and the tendency to screen out what is expected not to be acceptable to oneself or others. However, questions designed to elicit attitudes, for example, on where librarians feel their information-searching responsibilities end and patrons' begin would probably not be as badly biased by the factors mentioned above, and hence of interest.

As for the atmosphere of libraries, more work is needed on librarian

and patron attitudes. Incidentally, while this section has been on librarian attitudes, user attitudes are discussed in Section IX, "Use of the Library as a Whole," because such work as has been done on user attitudes is generally a part of other studies which fall under that rubric.

XIII. AVAILABILITY OF MATERIALS AND MOBILITY OF USERS

This topic covers two sides of the same coin--the availability of the literature and the ability of the user to get to it. These "sides" will be discussed in turn.

Ennis (56) has defined the critical question to be asked on the first side: "What differences in book reading result from variations in availability?" (p. 59). To be concerned solely with figures on the distribution of print sources in cities and the like, without relating them to use, would be going toofar afield. It is the relationship of availability to use which is of interest to us.

There appears to have been very little done on this. Three studies, all good, were found, each only touching on this to a moderate degree. However, this is a topic which is lacking in standard index terms--the idea for it came from Ennis' paper--and hence difficult to search for. Other relevant papers may have been missed.

Purdy (147) studied the predictors of good library resources (the most important was high economic status of the county) and the distribution of use of various print sources. For example, he found that the popularity of some print media was greater in counties with better library service than in those with poorer, but that other media complemented it, being more common in counties with poorer service. Hodgson's (80) focus was mainly on other matters which do not concern us, but he discusses the availability of

literature in rural homes and finds some interesting facts, e.g., "...except for borrowing from friends, every source of books was used to a greater extent in communities with public libraries than in communities without them" (p. 256). Finally, Ennis' study (56) was a preliminary one done in the process of asking for a grant. But he did get tentative results indicating that availability does affect reading, and suggests, therefore, that it is an area well worth researching further. (But no further papers on this particular topic have appeared by him.)

The other side of the coin, user ability to get to the literature, has a fairly large literature associated with it. This falls into two main categories, the effect of physical distance, and the effect of social immobility. Taking the former first, Bundy (43), Monat (120), Monat et al. (121), and Berelson (35) all discuss the effect of distance. Taking them together (see particularly Monat, p. 1306), it appears that distance has a step-form curve: Very great distances (over ten miles by car) seems to retard library use, while variation in distance below this level seems to have little effect, unless the user lives very close (within five blocks), in easy walking distance, in which case the use goes up. Slater (164, and longer paper on the same area: 163) discusses distance in a slightly different context: distance from office to technical library. Here the distances involved are generally smaller, yet the same effects can be found. She cites a case (164) in which the library was moved from a technical to an adminstrative area a short walk away and use by technical people declined markedly.

More interesting and difficult to research is the matter of social mobility. Here, low education, especially when asociated with low reading ability, and psychological hindrances have their effect. Winsor and Burrows (180) did a qualitative study of four library programs for the disadvantaged. They found that psychological distance was a greater deterrent generally

to library use than physical distance, though the latter played a part too. They encountered problems that would not occur to most middle-class librarians, for example, that the due date in the back of a book is often meaningless to ghetto dwellers.

Hiatt and Drennan's (77) "survey of practice" on public library services for the functionally illiterate is not a survey in a quantitative sense. However, types of adult education practices carried on by public libraries are listed. In an earlier study (76), Hiatt did some interesting research on "public library services for adults of low education." He did not take a random sample in the two libraries he studied, but instead purposely selected adults who had been strongly influenced by the library's adult education services in order to see what the nature of the influence was. (The libraries themselves were chosen for their higher-than-average level of activity in this area.)

Among other things, he describes several patterns of library use, one of which is that a number of adults enter the library only to bring their children--often without it occurring to them to use the library themselves. (Bundy's 1967 study [43] showed that 13% of adults entering the library were coming for this purpose.) Altogether, the most important of the adult education "services" seemed to be the friendliness and approachability of the librarians rather than any service in the usual sense.

This whole adult education area is an enormous one within librarianship and we cannot go further into it--interest must be restricted to those studies which bear fairly directly on the subtopic at hand.

A good study with direct bearing on the matter of accessibility is International Research Associates' Access to Public Libraries (85). It covers several access problems, discrimination against blacks in library policy, restrictions put on student use, and limitations for foreign users in terms

of low volume of non-English books in libraries. Emphasis is put on the first problem since it is unquestionably the most widespread and far-reaching in its effects. This study has aroused considerable controversy (143, 6); the reviewer leaves it to the reader to make his own judgment.

XIV. INFORMATION-GATHERING HABITS OF SCIENTISTS

This section is the first of four on scientists, technologists, and scholars of all sorts. The term "scientist" is used to cover the entire group for convenience. It is a good choice, given the nature of the literature--very little has been done on the information-gathering patterns of experts who are not scientists. This section will stress information habits in general, including all sorts of sources. The next section will cover studies solely on informal information transfer, and the section following that will be on studies of the use of purely formal sources. Finally, studies on environmental influences will be considered.

The topic of this section is far and away the largest of the review in terms of number of papers. The coverage will be roughly chronological, after the major reviews have been discussed.

Two of the best reviews of any part of the user study field were made on this subtopic. (They discuss all four "scientist" subtopics.) These are the Menzel (116) and Paisley (129) reviews, done in 1960 and 1965, respectively. The Weinstock et al. review (177) is shorter and focuses on medical researchers and literature. Menzel discusses the methodological issues in considerable detail. He does not consider the studies individually. Instead the second volume is composed of twenty-six tables, summarizing the results of the twenty-five or so studies being reviewed. These tables must represent a massive effort because the studies were seldom directly comparable and much data manipulation and qualification with footnotes had to be done in order to present

them.. Good as these tables are, they cannot be any better than the state of the field itself at that time. They represent too few studies done in too many different circumstances with too many different methodologies to produce satisfactorily convergent results. (One would hope that studying the same thing with different methods would produce roughly the same results; however, some of the methods were of such a nature that they were bound to produce markedly different results. For example, studies asking scientists how much they read get figures about double those of studies observing how much they read.) Some tables present more consistent results than others, and one can draw a few trends from them.

The main value of the tables and the review as a whole, however, seems to be in 1) pointing out that even with very good organization, the results up to that time in the field (1960) were still far from conclusive, and 2) providing an excellent dissection of methods to be used in improving the knowledge of the field through research.

The Paisley review (129) is extremely useful. It is the only one in this area which discusses a large number of studies in any detail. Paisley says his emphasis is on the objectives and methods of researchers, rather than on findings (pp. I-4, I-5), but the latter are generally described as well. There are critical evaluations of the studies throughout. He discusses over twenty general use studies in moderate detail, as well as about another ten in which the research environment is emphasized. He also gives detailed attention to a 1958 study of Menzel's, partly covered in Menzel (114), and to the first twelve reports of the American Psychological Association's Project on Scientific Information Exchange in Psychology. Finally, he considers research from the "systemic approach," with emphasis on citation studies, and research on flow of information to the public (corresponding to our Section XVIII).

By 1965 considerably more work had been done than Menzel was able to report in 1960; Paisley's excellent review is an obvious starting-place for reading in this area. Although he covers studies done prior to 1960 as well, i.e., during the period covered by Menzel, both the Paisley and Menzel reviews should be read because the emphases and approaches are different and both worthwile.

Two of the earliest, and very well done, studies were by Herner: Herner (72), and Herner and Meyer (75). Old as it is (1954), the Herner study is a model of the best of the first phase of user studies, that is, studies done without the sophisticated multivariate analyses that have become popular in the last few years. It had a large, carefully selected sample base (over 600 scientists), and subjects were interviewed at length with a prescribed schedule. A number of different variables were brought out in the tabulations; this study was either the earliest or one of the earliest to point out the importance of distinguishing between pure and applied scientists in information habits. The Herner and Meyer study has some interesting results on the use of all foreign literature, not just Soviet literature, as the title suggests. It points up, in an indirect way, the "principle of least effort" factor in information gathering that Allen and Gerstberger (5) were to focus on ten years later.

The International Conference on Scientific Information (ICSI) in 1958 (papers published in 1959) was a landmark in the history of this area of research. The section on user studies contains a number of studies which are excellent and still hold their own with others today. A number will be discussed here; others will be mentioned in appropriate sections.

The Fishenden study (62) is interesting for its improvement on the usual diary study; the diary cards employed were much easier for the researcher to use and hence he was more likely to record his activities accurately. The

Halbert and Ackoff study (69) is interesting methodologically also. Fifteen hundred chemists were observed at random times and their activities recorded. Thus much greater accuracy on distribution of activities (including scientific communication) was obtained than is possible with questionnaires. The Hogg and Smith study (81) used the diary method and suffered because many of the subjects in the study apparently held off to fill out the diary until they had time to do some reading! Some of the data are not seriously affected by this fact, however, and are of interest. Of particular interest is how <u>little</u> traditional library-related sources--library catalogs, abstracting journals--are used as sources for references.

The Glass and Norwood paper (67) is a very brief one describing a study they did to determine how scientists learn of work of importance to them. Informal sources figure prominently in this paper as well as in Herner's paper in the same volume (71). The latter paper reports aspects of the 1957 study (Herner and Meyer, 75) not there reported, namely, American medical scientists' information-gathering habits in general, as opposed to just their use of foreign literature. The Scott study (159) is also concerned with many aspects of information gathering, in this case by applied workers. The Törnudd paper (172) is of greatest interest for its verbal summary of the results of a great many studies to that time.

Unquestionably the single most comprehensive and unified study of scientific communication and information use is the American Psychological Association's Project on Scientific Information Exchange in Psychology (8). The twenty-two reports produced between 1963 and 1968 cover almost every imaginable aspect of information use among psychologists. These reports will be discussed in appropriate sections; four will be mentioned here. These four make a rather miscellaneous group; because the project is so unified, pulling it apart for different sections of this paper may not be the best thing for it. However,

it is done to maintain the integrity of the subtopics.

Report #1 (10) was a preliminary one to get a feel for psychologists' information activities in general. The scientists kept logs and answered a questionnaire. Report #4 (13) focused on the convention as a source of information. Convention attendants were asked about their success in acquiring desired information at several psychological conventions of differing character, as well as about what aspect of the convention program was most fruitful in this regard. Report #10 (19) compares the use of various information sources by American and foreign psychologists--and finds them quite similar. Report #17 (26) touches on an area rarely covered in use studies, preparation for teaching; the information habits involved in the preparation of courses in undergraduate psychology are examined.

The APA studies are comprehensive--but only in one field. What differences are there in information-gathering habits of scientists between fields? William Garvey, one of the heads of the APA project, appears to be trying to answer that question in his new post at the Johns Hopkins Center for Research in Scientific Communication. He is heading a project which, in cooperation with several scientific societies in varying fields, is systematically studying various aspects of information use in the several fields (88). Unfortunately, the work of comparing and collating the data of these studies--a research study in itself--does not appear to have been done yet, or at least is not available. These studies are laying the groundwork for such comparisons, but in their current state they are not of much direct use, except as descriptions of the individual fields.

Slater's descriptions of use and users of industrial libraries are interesting (164, and longer paper on the same area: 163). For example, administrative types more frequently have librarians look things up for them (instead of doing it themselves) than scientific and technical types.

Three large studies conducted during the mid-sixties were the Department of Defense user needs study, phases I (31) and II (126), and Rosenbloom and Wolek (155). Phase I of the DOD study (Auerbach Corporation) was concerned with research and development personnel in the Department of Defense, Phase II (North American Aviation) with the same sorts of personnel in the defense industry. In the Phase I report there is an enormous amount of data, much of it in an obscure computer printout tabular form. From a summary chapter (vol. 1), however, one can learn of the characteristics of the information wanted by the R & D personnel, where they acquired it, and whether they got it in time. Berul and Karson (38) explain the reasoning behind the methodology selected for this study. The Phase II research covered similar questions, described in three volumes; the first volume contains a non-technical summary of the results and recommendations. The Rosenbloom and Wolek study was concerned with all the sources of information scientists use, with particular emphasis on whether and in what circumstances information was gotten from inside or outside the scientist's organization.

The thesis by Stinson (167), a library school Master's student, is one of the few studies done by librarians which probe information gathering in general, rather than use from the point of view of source. It is of "classic" form, that is, it uses a questionnaire on frequency of use of various sources. It includes students, as well as faculty members in biology.

Thomas Allen, by himself and with various collaborators, has produced a number of papers using fruitful techniques which are novel in the user study field. An important contribution of his is a method which approaches a true experiment more closely than that of any other study reviewed, with the possible exception of Lipetz' study (99, see Section XVI). Teams writing proposals, or otherwise in competition to perform the same job, are compared on their information-gathering habits. Patterns of successful teams (their

proposal accepted) are compared to those of unsuccessful teams. Sometimes a "solution development record" is used in which project heads are asked to estimate probabilities that alternative solutions to problems will be accepted as the project goes along. Whenever the probabilities are changed on a given solution, the project head is asked to recall the source of information leading to the change of probability (see 2). Quite a change from the early days of "Where do you get most of your information?"! The Allen 1964 paper (3) and the aforementioned 1966 paper (2) are examples of his general approach.

Two papers, one by Allen and Gerstberger (5) and the other by Rosenberg (154), confirm the principle of least effort in information gathering--information channels are chosen on the basis of ease of use and accessibility, rather than on the amount of information they are expected to provide. Paisley and Parker (131) studied convention attendants and determined preferred sources at the convention (informal conversation, contributed papers, etc.) for different kinds of information, and also studied preferences for information sources as related to the characteristics of users.

XV. INFORMAL INFORMATION TRANSFER AMONG SCIENTISTS

An important sub-class of studies on informal communication is that centering around so-called "invisible colleges." The term was first introduced, or more accurately, revived, by Price in 1963 (145, p. 85). He used it to describe a "closed group" of scientists who frequently exchange preprints and meet on a "commuting circuit of institutions, research centers, and summer schools," so that "over an interval of a few years everybody who is anybody has worked with everybody else in the same category" (p. 85).

Most of the work in this area is, understandably, quite recent. Lingwood (98) surveyed several studies that had been made up until that time (1969).

One has difficulty reconciling Price's definition of the term with Lingwood's. The latter allows much weaker definitions, at one point mentioning an "open social system" (p. 2), which is just the opposite of Price's "closed group," at another, being more specific, "All we can require, given the data at hand, is that groups be located as a result of partitioning which exhibit an above-chance degree of research speciality similarity, or that specialty groups exhibit a greater than chance tendency toward higher inside-group communication" (p. 179). The idea of invisible colleges is so appealing that it appears to have drawn many researchers on it research on it, even in the face of negative or neutral evidence.

In the conclusion of her 1969 paper (51), Crane presents an excellent discussion of the definitional issues. She points out that completely closed groups of researchers would lead to what sociologists call "sects," with many characteristics in common with religious sects, whereas complete scatter, complete failure for there to be grouping of communication and association, would mean that the research in an area could not cumulate, ideas would be lost, research repreated (p. 349). Extremely ardent followers of certain "schools" who read only what each other write and minor areas which have been indifferently and occasionally pursued perhaps qualify as these extremes, but most of scientific communication lies in between.

Mullins (124) did not find any evidence of invisible colleges. This may have been due to the particular methodology he used. Most studies since then have found some evidence of invisible colleges (contingent, of course, on their own definition of the term) and have gone part way toward describing the specific nature of the interaction. Examples of such papers are Lingwood's own study (98), Price and Beaver (146), Crane (51), and APA Report #21 (30).

Turning now to informal communication in the more general sense, Herbert Menzel is the chief, and probably the original, champion of the idea that

informal communication is a very important part of a scientist's information network. This importance is brought out in his paper in the International Conference on Scientific Information (114) in which the prominent patterns of getting unanticipated useful information are described, and they are most commonly through informal channels. In another article he proposes that "formal steps can be taken and planned on the aggregate level to maximize what, from the individual's point of view, are fruitful encounters and lucky accidents" (115, p. 58).

Several other studies make important contributions in this area. Libbey and Zaltman (96) studied the network of preprint (and other informal written communication) exchange among theoretical high energy physicists. This includes statistics on the rate of flow of these items, as well as the influence they have on current work.

The Bernard et al. (37) and Shilling and Bernard (160) papers are two parts of a report on the same study. This was quite an extensive study of informal communication of many types among biological scientists. Effects of age and sex on informal communication practices were examined, as well as the effect of laboratory practices and policies on productivity and efficiency of use of information (as measured by several indices).

Allen and Cohen's study (4) appears to have confirmed the very interesting hypothesis that the two-step flow of communication, long established in the general theory of communication among the public, applies in the laboratory as well. They found that the sociometric conversational "stars," those people most often turned to for technical discussion, also monitored sources of information outside the laboratory proper (including the literature) significantly more than the others. Thus they served as gatekeepers of information--ergo, the "two-step flow," first to the gatekeeper and then to the others.

XVI. USE OF FORMAL SOURCES OF SCIENTIFIC INFORMATION

Most of the American Psychological Association's studies (8) fall into this category, examining, as they do, conventions and various print media as communication channels. Report #3 (12) was a study of changes in APA conventions over a range of twenty-five years. Report #5 (14) examined the life histories of items presented at conventions, when the research was initiated on the material presented at the convention, whether prior reports of the results had been made, rate of reprint requests afterward, etc. Report #6 (15) determined the publication fate of formal presentations at a convention during the five years following the convention. Report #8 (17) compared psychological conventions by meeting level (state, regional, national), and Report #20 (29) examined yet another meeting level: international.

In the area of print sources, two of the APA studies examined the production of print materials, #2 (11) the preparation of chapters for the Annual Review of Psychology, and #7 (16) the writing of journal articles. The studies include data on the information sources used and the problems attendant thereto in the process of producing this literature.

Four other APA studies each took one formal print channel and studied appropriate aspects of its function in the information network: #9 (18), journal articles; #13 (22), technical reports; #14 (23), books; and #15 (24), Psychological Abstracts, the major abstracting journal in the field. Report #9 used an interesting method; questionnaire respondents were asked whether and how carefully they had read specific articles. The study thus yielded figures on average readership of certain journals and article types. The percentage of respondents who had read a given article was generally quite low--about half the articles had been read by less than 1% of the respondents.

There remain two other articles to be discussed in which the emphasis is on a formal source. Harris and Katter (70) were concerned with the impact

of and uses made of the first volume of the Annual Review of Information Science and Technology. Lipetz (99) performed a field experiment by using control and treatment regions in the distribution of a citation index of a subset of the physics literature. He was interested in determining the effect of this index on the use of the literature indexed therein. During the year-long experiment, only a slight, but measurable impact was detected.

XVII. SOCIOLOGICAL AND ENVIRONMENTAL FACTORS IN SCIENTIFIC INFORMATION SEEKING

The three main factors of interest here are information use, environment and productivity. The first two are self-explanatory; the third should be explained. Many studies, particularly more recent ones, have been concerned with the relationship between information use and productivity, that is, with the information patterns associated with high scientific output (generally measured as number of papers produced). Productivity is certainly intimately associated with the individual scientist and is not an environmental factor. Nonetheless, it seems to fit here because studies often associate environment with productivity. In fact, as we shall shortly see, the above three factors seem frequently to co-occur in one comination or another.

The studies to be discussed in this section each fall fairly easily into one of three logical combinations of the three factors mentioned at the beginning of this section. The three are:

environment related to productivity

environment related to information use

productivity related to information use

Several studies relate environment to productivity in various ways. The most comprehensive available must surely be Pelz and Andrews' book (138). It is the result of years of research into a dozen major aspects of the research environment and their effect on productivity. These two gentlemen had the

tremendous self-discipline to suppress the natural tendency to think one's work too important and multifarious to be briefly summarized--they give one-sentence summaries of results as subtitles to each chapter heading. From the chapter on communication and its relation to productivity we learn that, in general, the higher the level of communication with others, the greater the productivity. The authors give some evidence indicating that the direction of this relationship is not one of higher productivity leading to more contacts, as we might expect, but rather the reverse.

In a briefer paper than Pelz and Andrews', Meltzer (109) discusses other factors related to productivity, such as importance attached to publication by the organization, freedom allowed in research, and funds and facilities available. Crane (50) focuses on the effect of university type on productivity. Association with major, as opposed to minor, universities is correlated with high productivity. Cole and Cole (49) give interesting results of a study on the much-debated issue of the relative value placed on quantity and quality of papers produced. On the basis of a number of different measures they conclude that in general quality counts more--in physics, at least.

Several papers touch in one way or another on environment related to information use. APA Report #11 (20) attacks it head on by studying information flow patterns in two quite different research environments: an academic department and a government research laboratory. Slater's (164) qualitative approach adds some factors not otherwise uncovered. For example, she found that the status accorded the librarian by management had a marked effect on library use and approaches made to the librarian for help. Higher-graded librarians were more likely to be asked for help. Wilensky (178) approaches the organization-information relationship from quite a different point of view--that of intelligence use. Though technically somewhat peripheral to our subject, Wilensky's insights on this little-researched area are helpful.

He discusses, in a highly tentative manner, the organizational characteristics which are associated with good and poor fidelity in the transfer of intelligence through the organization to decision-makers.

Studies of communication in small groups would seem, on the face of it, to be highly relevant to communication practices in a research environment where men and women often work in small groups. However, the distance between the pure laboratory experiments described by Glanzer and Glaser (66) in their review of many such studies and the realistic laboratory situation is too great. The experiments are lacking in the many real-life impurities which one must work with to say anything meaningful in this field.

Finally, let us consider information use as related to productivity. Allen's 1964 and 1966 papers (3, 2) have already been mentioned. One of the most interesting facts revealed by these studies is that the use of external consultants is negatively correlated with quality of results. (The Shilling and Bernard study [160] also found similar evidence, but related to productivity, rather than quality.)

The Baker et al. paper (33) associates information sources with ideas gotten in brainstorming sessions. A distinction is made between the idea itself ("need event") and the means for achieving it ("mean event"). Ideas of the two types are associated with patterns of use of sources. Maizell (103) developed several measures of creativity and studied differences in information use patterns among chemists high and low on these creativity measures.

The APA Report #19 (28) correlates membership in psychological organizations with information seeking and productivity. Paisley and Parker (133), in the original and longer version of an earlier mentioned study (131), found that higher information input is associated with higher productivity. In a later study (Parker et al., 135) this was refined even more and it was found that it was not information input in general but <u>informal</u> information input which is the

best predictor of high productivity. This parallels Pelz and Andrews' findings.

XVIII. INFORMATION-GATHERING HABITS OF THE GENERAL PUBLIC

Drawing a line on what should and should not be included in this sub-topic is more difficult than for any other in this field. At every turn it threatens to balloon into a ridiculously-too-large field by including huge chunks of communication, sociology, psychology, social psychology, etc. Perhaps this is partly because the topic itself seems more diffuse--the number of possible sources of information very large, and the ways of getting it equally diverse. There are countless variables potentially involved.

Nonetheless, it is important that we make some attempt to cover this area. As with scientists and technologists, the library is just one of many sources of information for members of the general public, and we should see where it fits into broader information-seeking patterns. A number of papers directly relevant to this area will be described; the vast areas of materials in these social sciences which are less directly relevant will be left out.

The papers to be discussed in this section fall into the following categories, and will be discussed in the order given: 1) theoretical comments, 2) focus on content--state of public knowledge in various subject fields and the characteristics of those knowing, 3) focus on information channels--channels used to get various sorts of informatinn, predictors of the use of various channels, 4) focus on print materials--various sources of printed matter.

Hyman and Sheatsley (84) provide an interesting set of propositions on the nature of people's search for and receptivity to information. Katz (90) gives a recent discussion of the hypothesis of the two-step flow of information. The Katz and Lazarsfeld book (91) is an earlier and much longer description of some of the research on this and related hypotheses (see also Section XV). An excellent paper by Schramm and Wade (158) pulls together the data from

several studies on the state of public knowledge and makes some theoretical comments on it. Paisley (129) has a chapter in which he reviews and summarizes a number of works on the state of scientific knowledge of the public and the sources they use to get this information. The chapter includes a several-page summary of the large University of Michigan study mentioned below (174).

Three large studies represent the sort of work which is done on determining the state of public knowledge about various topics and the characteristics of those who know more as compared with those who know less. The Feldman (60), Robinson (153), and University of Michigan (174) studies examined health, world affairs, and science knowledge respectively.

Going on to the channels used, Campbell and Metzner (46) report results on where people say they would go to get information on various topics. (There was very little mention of libraries, incidentally.) The Stanford University Institute for Communication Research did a study on where people actually do go for information on various topics (166, not examined, information here from Paisley's review--129). It turns out that the sources people do use are often quite different from those they say they would use.

Rees and Paisley (152) and Rees and Paisley (151) are both useful; they are reports of two studies on the same data base. The papers discuss a wide range of information-seeking behaviors and relate them to a number of important social and psychological variables. The Johnstone and Rivera book (89) performs a similar task but focuses on a single major channel of information: adult education.

Turning now to the use of print sources, both Berelson (35) and Monat et al. (121) given figures on the relative use of various sources of books by the public. Ennis (56), although only giving a preliminary report in the process of asking for a grant, produced one of the most extensive studies on book use, including, among other things, a qualitative discussion on why people read

(based on non-random interviews), quantitative data on patterns of book use through life, various sources of books, etc.

XIX. THE INFORMATION SYSTEM AS A WHOLE

All the papers to be discussed in this section look at whole systems in one way or another, either studying particular systems, or discussing information systems philosophically.

As mentioned elsewhere both the American Psychological Association's Project on Scientific Information Exchange in Psychology (8), and the Johns Hopkins project (88) investigating several scientific disciplines view whole information systems, rather than only elements thereof. This systemic view is true of the APA project as a whole, separate studies being devised so as to contribute to the broader conception, but most of the individual papers do not view the system as a whole. These have been discussed elsewhere. Some of the papers are concerned with the broader psychological information system, however, and these will be discussed next.

The APA Report #B (9) was published after much of the work on the project had been done and summarizes much of what had been discovered. This includes a description of the time sequence of publication and other dissemination of research results, giving average length of time between initiation of research and first oral report, time between reports and journal publication, etc.

Several other APA reports are concerned with the matter of making innovations in the system and the likely or actual effects thereof. Report #12 (21) discusses types of innovations possible and their likely effects. Siegmann and Griffith (162) and Report #15 (24) both discuss a set of proposed changes in Psychological Abstracts, the principal abstracting journal in psychology. Reports #16 (25) and #18 (27) discuss innovations that actually were initiated. Number 16 discusses 1) listing of titles and authors of manuscripts accepted

by journals with long publication lags, and 2) preconvention publication of proceedings of the APA national convention. It was found that these had useful effects on information exchange. Report #18 repeated the second experiment with the added requirement that psychologists pay for the proceedings volume.

Menzel (117) looks upon scientific information systems from a broad philosophical point of view and describes five major themes, most of which emphasize the need to look at the whole system, not just components. In another paper (115) he focuses on unplanned communication and suggests that if we look at it from the level of the whole system, we can improve the overall rate of these "accidental" information transfers. Swanson (169) pulls together several of the matters discussed earlier in this review, the principle of least effort, invisible colleges, etc., and makes some excellent and intriguing suggestions on what the future course of information system design should be.

In an important book, Little Science, Big Scienc (145), Price provides an extensive and valuable discussion of the growth and other characteristics of scientific literature, as well as of relevant aspects of the sociology of science. In another paper (144) he discusses the relationship between science and technology. Though these are generally seen as two steps of one process (first, discovery, then application), he finds that there is little interaction between them, especially as seen in the literature. In a similar vein, Marquis and Allen (105) discuss the differences between science and technology in communication practices. An understanding of the nature of scientific and technological communication and literature would appear to be necessary in making studies of use; in fact, significant use differences have been found repeatedly between scientists and technologists. These are probably due in some way to the characteristics Price and Marquis and Allen describe.

XX. METHODOLOGY AND PHILOSOPHY OF USER STUDIES

The title of this section is self-explanatory. The plan is to go from small, concrete topics to increasingly general and abstract ones.

Fussler and Simon (64) give an excellent discussion of the methodology of browsing studies. Raisig (148) dissects the prevailing approaches in periodical use studies and proposes new ones. Jain (87) and Meier (107) propose two different units of measurement for library circulation which are superior to the usual ones. Jain (86) discusses the relative merits of two broad approaches to library materials use, use histories of individual volumes vs. characteristics of materials charged out of the library during a short period. Martin (106) describes the use of random alarm devices to remind scientists to record their reading behavior. Ennis and Fryden (58) give an excellent lesson for librarians in how to conduct their own simple user studies to meet local needs.

Weinstock et al. (177) have a good listing of the general faults of previous user studies. Parker and Paisley (137) and Paisley (129) have good, fairly brief discussions of the various methods used in user studies. As mentioned earlier, Menzel (116) has a more extensive discussion of methods. Containing far and away the most extensive coverage of methods, as well as a text on social scientific research in general is Paisley's "Appendix on Method" (128). This eighty-five-page paper is so broad in scope as to function as a text with the added bonus of having the applications and examples in the information use field. (It is in fact an appendix to a forthcoming book on scientific information use.)

The articles on information needs and uses in the Annual Review of Information Science and Technology (1966: 112; 1967: 74; 1968: 130; and 1969: 1) all discuss methodology to a greater or lesser extent. Of particular interest is Paisley's conceptualization of the field in ten more or less concentric circles, from the scientist within his own head to the scientist in his culture (130).

Ennis (57) suggests novel approaches in user studies. For example, he proposes that we distinguish among special interest groups of general users, as with ethnic groups, just as we distinguish among subject fields of experts in comparing variations in information need. Bernal (36) puts forth both as-yet-untried experimental methods and questions needing study in the field. Menzel (111) asks the question, "Can Science Information Needs Be Ascertained Empirically?" He discusses the problems involved, and generally concludes that these needs <u>can</u> be studied but with appropriate caveats in mind. He also presents an interesting paradigm of science information needs, which can help in structuring research. O'Connor (127) discusses the conflicting, and often vague, definitions of "information need" in the literature. However, his paper is disappointing because he does not then go on to suggest any definitions of his own.

Perhaps the most fundamental philosophical question of all in user studies is whether the user should be studied at all. Four papers constitute a set of arguments on this issue. Taube (170) argues that information scientists are the experts and should no more let users determine the character of information systems than doctors should let the public vote on whether or not medicines should be used. So studies of use done with the intention of using their data to influence information system design are silly, in his view.

A Paisley and Parker article (132), with some qualifications in Parker (134), takes almost the exact opposite view, talking about "Information Retrieval as a Receiver-Controlled Communication System," and saying: "The ultimate criterion for evaluation of receiver-controlled communication systems ought logically to be receiver satisfaction" (p. 23). Menzel (113) takes a stand in the middle between Taube and Paisley and Parker, saying that information scientists are indeed the experts but that on the other hand, knowledge of information needs "cannot be derived by deductive reasoning" (p. 17).

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